PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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COPY

WRITTEN OPINION
(PCT Rule 66)

Date of mailing *(day/month/year)*	24.09.2004
Applicant's or agent's file reference: AJC/P100377WO	**REPLY DUE** within 1 month(s) from the above date of mailing

International application No	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB 03/02870	03.07.2003	03.07.2002

International Patent Classification (IPC) or both national classification and IPC
G21F9/00

Applicant
BRITISH NUCLEAR FUELS PLC et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

I	☒	Basis of the opinion
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain documents cited
VII	☐	Certain defects in the international application
VIII	☐	Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66 4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 03.11.2004

24/10/04

Name and mailing address of the international preliminary examining authority:

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I. Basis of the opinion

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed")*:

Description, Pages

1-5 as originally filed

Claims, Numbers

1-13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:
   - ☐ the drawings, sheets:

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1,3-7,13 no
Inventive step (IS)	Claims	2,8-12 no
Industrial applicability (IA)	Claims	1-13 yes

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: WO 96/02918 A (TERRA ENVIRONMENTAL) 1 February 1996 (1996-02-01)
D2: US-A-4 010 108 (HANSEN LARRY J ET AL) 1 March 1977 (1977-03-01)
D3: US-A-4 839 102 (BERNARD ANDRE ET AL) 13 June 1989 (1989-06-13)
D4: US-A-4 416 810 (NOAKES JOHN E) 22 November 1983 (1983-11-22)
D5: US-A-4 792 385 (SNYDER THOMAS S ET AL) 20 December 1988 (1988-12-20)
D6: US-A-4 931 192 (MCBRIDE MICHAEL A ET AL) 5 June 1990 (1990-06-05)

1. OBJECTIONS AS TO NOVELTY (ARTICLE 33(2) PCT)

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1,3-7,13 is not new in the sense of Article 33(2) PCT.

Claim 1

Document D1 discloses (see claims 31,33,34 and 40 of D1) a method for the encapsulation of a nuclear material which comprises treating the material with an encapsulant which comprises a cementitious material and curing said cementitious material.

The subject-matter of claim 1 is therefore not new.

Claim 3

In the method of D1, the cementitious material comprises Portland cement.

The subject-matter of claim 3 is therefore not new.

Claim 4

In the method of D1 (see claims 22 and 23), the cementitious material additionally comprises one ore more inorganic fillers.

The subject-matter of claim 4 is therefore not new.

Claim 5

In the method of D1, the cementitious material is provided in the form of an aqueous composition.

The subject-matter of claim 5 is therefore not new.

Claim 6

In the method of D1 (see claim 8), the water content of the composition is in the region of 40-50% by weight.

The subject-matter of claim 6 is therefore not new.

Claim 13

Referring to D1, it appears that the subject-matter of claim 13 is not either new.

Furthermore, referring to any one of documents D2, D3 and D4, the subject-matter of claims 1,3-6,13 appear to lack novelty, and referring to D5 or D6, the subject-matter of claims 1 and 13 again appear to lack novelty.

Claim 7

In the method of D4 (see column 10, lines 21-22), the nuclear material is placed in an appropriate container and a cementitious material is added and allowed to at least partially cure.

The subject-matter of claim 7 is therefore not new.

2. OBJECTIONS AS TO INVENTIVE STEP (ARTICLE (33(3) PCT)

Claims 2,8-12

The features of claims 2 and 8-12 are merely straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

Thus the subject-matter of said claims does not involve an inventive step and does not satisfy the criterion set forth in Article 33(3) PCT.

CLAIMS

1. A method for the encapsulation of a nuclear material which comprises treating the material with an encapsulant which comprises a cementitious material and curing said cementitious material, characterised in that said nuclear material comprises uranium metal or Magnox fuel elements or fuel element debris.

2. A method as claimed in claim 1 wherein the cementitious material comprises Portland Cement.

3. A method as claimed in claim 1 or 2 wherein the cementitious material additionally comprises one or more inorganic fillers selected from blast furnace slag, pulverised fuel ash, hydrated lime, finely divided silica, limestone flour and organic and inorganic fluidising agents.

4. A method as claimed in claim 1, 2 or 3 wherein the cementitious material is provided in the form of an aqueous composition.

5. A method as claimed in claim 4 wherein the water content of the composition is in the region of 40-50% (w/w).

6. A method as claimed in any one of claims 1 to 5 wherein the nuclear material is placed in an appropriate container and a cementitious material is added and allowed to at least partially cure.

7. A method as claimed in claim 6 wherein elements of the nuclear material are either arrayed in the container or mixed haphazardly.

8. A method as claimed in claim 6 or 7 wherein the container is subsequently capped.

9. A method as claimed in claim 6, 7 or 8 wherein the container comprises a drum having a capacity in the region of 500 litres.

10. A method as claimed in claim 9 wherein the amount of nuclear material stored is up to 52 elements.

11. A method as claimed in claim 10 wherein the number of elements is of the order of 22.

12. A method for the storage of a nuclear material which comprises encapsulation of the material in a cured cementitious material, wherein said nuclear material comprises uranium metal or Magnox fuel elements or fuel element debris.